SHARP SERVICE MANUAL

CODE : 00ZXEA403USME

ELECTRONIC CASH REGISTER

MODEL XE-A403

(U version)

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Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

SHARP CORPORATION

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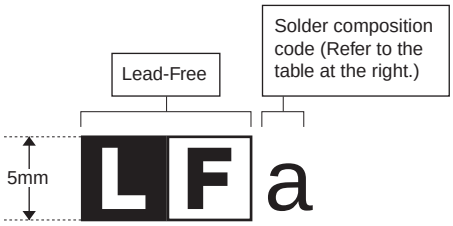
The contents are subject to change without notice.

LEAD-FREE SOLDER

The PWB's of this model employs lead-free solder. The "LF" marks indicated on the PWB's and the Service Manual mean "Lead-Free" solder.
The alphabet following the LF mark shows the kind of lead-free solder.

Example:



<Solder composition code of lead-free solder>

Solder composition	Solder composition code
Sn-Ag-Cu	a
Sn-Ag-Bi Sn-Ag-Bi-Cu	b
Sn-Zn-Bi	z
Sn-In-Ag-Bi	i
Sn-Cu-Ni	n
Sn-Ag-Sb	s
Bi-Sn-Ag-P Bi-Sn-Ag	p

(1) NOTE FOR THE USE OF LEAD-FREE SOLDER THREAD

When repairing a lead-free solder PWB, use lead-free solder thread. Never use conventional lead solder thread, which may cause a breakdown or an accident.

Since the melting point of lead-free solder thread is about 40°C higher than that of conventional lead solder thread, the use of the exclusive-use soldering iron is recommendable.

(2) NOTE FOR SOLDERING WORK

Since the melting point of lead-free solder is about 220°C, which is about 40°C higher than that of conventional lead solder, and its soldering capacity is inferior to conventional one, it is apt to keep the soldering iron in contact with the PWB for longer time. This may cause land separation or may exceed the heat-resistive temperature of components. Use enough care to separate the soldering iron from the PWB when completion of soldering is confirmed.

Since lead-free solder includes a greater quantity of tin, the iron tip may corrode easily. Turn ON/OFF the soldering iron power frequently.

If different-kind solder remains on the soldering iron tip, it is melted together with lead-free solder. To avoid this, clean the soldering iron tip after completion of soldering work.

If the soldering iron tip is discolored black during soldering work, clean and file the tip with steel wool or a fine filer.

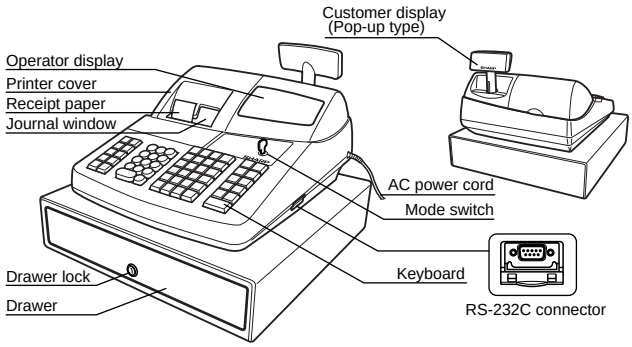
CAUTIONS

THERE IS A RISK OF EXPLOSION IF THE BATTERY
IS REPLACED BY AN INCORRECT TYPE.
PROPERLY DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS.

CHAPTER 1. SPECIFICATIONS

1. APPEARANCE

■Front view ■Rear view



2. RATING

	XE-A403
Weight	28.0lb (12.7kg)
Dimensions	420 (W) x 429 (D) x 297 (H) mm 16.6 (W) x 16.9 (D) x 11.7 (H) inches
Power source	AC 120V (±10%), 60Hz
Power consumption	Stand-by 9W, Operating 49W (max.)
Working temperature	0°C~40°C (32°F to 104°F)

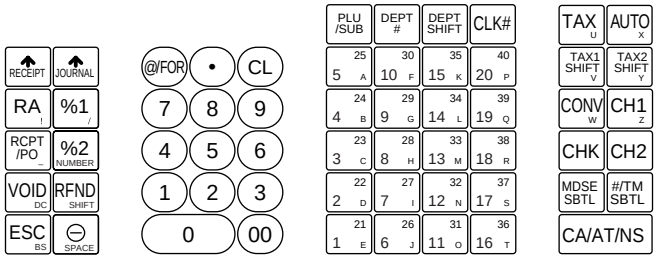
3. KEYBOARD

3-1. KEYBOARD LAYOUT

	XE-A401/A403
Type	Normal keyboard
Key position	STD/MAX 59
Key pitch	19 (W) x 19 (H) mm
Key layout	Fixed type

3-2. KEY LIST

■Keyboard layout



Note: The small characters on the bottom or lower right in each key indicates functions or characters which can be used for character entries for text programming.

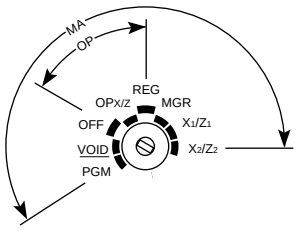
■ Key names

KEY TOP	DESCRIPTION
↑ (RECEIPT)	Receipt paper feed key
↑ (JOURNAL)	Journal paper feed key
RA	Received-on account key
RCPT/PO	Receipt print/Receipt on/off & Paid-out key
VOID	Void key
ESC	Escape key
%1, %2	Percent 1and 2 key
RFND	Refund key
⊖	Discount key
@/FOR	Multiplication key
•	Decimal point key
CL	Clear key
0-9,00	Numeric Keys
PLU/SUB	PLU/Subdepartment code entry key
DEPT#	Department code entry key
DEPT SHIFT	Department code entry shift key
CLK#	Clerk code entry key
Dept1-40	Department 1 to 40 keys
TAX	Manual tax entry key
TAX 1 SHIFT	Tax 1 shift key
TAX 2 SHIFT	Tax 2 shift key
AUTO	Automatic ally entry key
CONV	Currency Conversion key
CHK	Check Menu key #1
CH1, CH2	Charge 1 and 2 keys
MDSE SBTL	Merchandise subtotal key
#/TM/SBTL	Non-add code/Time display/Subtotal key
CA/AT/NS	Total/Amount tender/Non Sale key

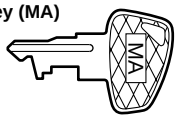
4. MODE SWITCH

4-1. LAYOUT

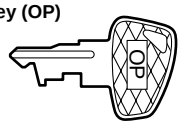
• Rotary type



Manager key (MA)



Operator key (OP)



The mode switch can be operated by inserting one of the two supplied mode keys - manager (MA) and operator (OP) keys. These keys can be inserted or removed only in the “REG” or “OFF” position.

The mode switch has these settings:

OFF: This mode locks all register operations. (AC power turns off.) No change occurs to register data.

OP X/Z: To take individual clerk X or Z reports, and to take flash reports.

It can be used to toggle receipt state “ON” and “OFF” by pressing he [RCP/PO] key.

REG: For entering sales.

PGM: To program various items.

VOID: Enters into the void mode. This mode allows correction after finalizing a transaction.

MGR: For manager’s entries. The manager can use this mode for an override entry.

X1/Z1: To take the X/Z report for various daily totals.

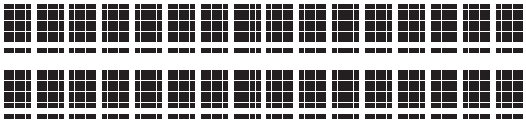
X2/Z2: To take the X/Z report for periodic (weekly or monthly) consolidation.

5. DISPLAY

5-1. OPERATOR DISPLAY

	XE-A401	XE-A403
Display device	LCD	
Number of line	2 line	
Number of positions	16 digits/line	
Color of display	Yellow / Green	
Character form	7 segment + Dp	5 x 7Dot matrix
Character size	14.2 (H) x 7.9 (W) mm	8.0 (H) x 4.8 (W) mm

Layout:

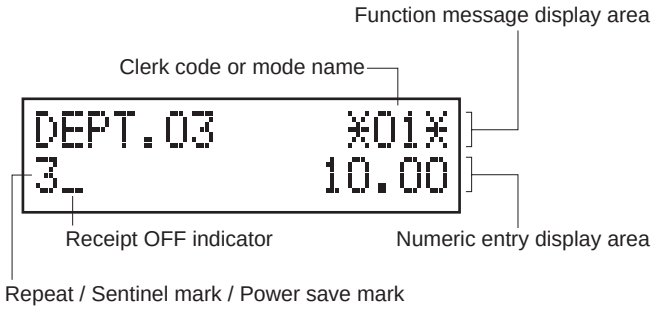


5-2. CUSTOMER DISPLAY

	XE-A401	XE-A403
Display device	LED	
Number of line	1 line	
Number of positions	7 positions	
Color of display	Yellow / Green	
Style	Pop up type	
Character form	7 segment + Dp	5 x 7Dot matrix
Character size	14.2 (H) x 7.9 (W) mm	14.2 (H) x 7.8 (W) mm

Layout:

■Operator display



- Clerk code or Mode name

  The mode you are in is displayed. When a clerk is assigned, the clerk code is displayed in the REG or OP X/Z mode. For example, “*01*” is displayed when clerk 01 is assigned.

- Repeat

  The number of repeats is displayed, starting at “2” and incremental with each repeat. When you have registered ten times, the display will show “0” (2 → 3.....9 → 0 → 1 → 2...)

- Sentinel mark

  When amount in the drawer reaches the amount you preprogrammed, the sentinel mark “X” is displayed to advise you to remove the money and put it in a safe place.

- Power save mark

  When the cash register goes into the power save mode, the power save mark (decimal point) lights up.

- Function message display area

  Item labels of departments and PLU/subdepartments and function texts you use, such as %1, (-) and CASH are displayed.

  When an amount is to be entered or entered, “AMOUNT” is displayed: When an amount is to be entered, ------- is displayed at the numeric entry area with “AMOUNT”. When a preset price has been set, the price is displayed at the numeric entry area with “AMOUNT”.

- Numeric entry display area

  Numbers entered using numeric keys are displayed here.

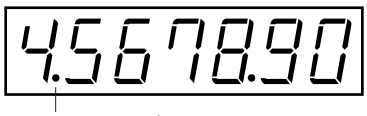
Date and time display

Date and time appear on the display in the OP X/Z, REG, or MGR mode. In the REG or MGR mode, press the [#/TM/SBTL] key to display the date and time.

Error message

When an error occurs, the corresponding error message is displayed in the function message display area.

■Customer display (Pop-up type)



Power save mark
(Lighting the mark only under the power save mode)

6. PRINTER

6-1. PRINTER

- Part number : PR-45M II
- NO. of station : 2 (Receipt and journal)
- Validation : No
- Printing system : Line thermal
- No. of dot : Receipt: 288 dots
  Journal: 288 dots
- Dot pitch : Horizontal: 0.125mm
  Vertical: 0.125mm
- Font : 10 dots (W) × 24 dots (H)
- Printing capacity : Receipt max. 24 characters
  Journal max. 24 characters
- Character size : 1.25mm (W) × 3.0mm (H) at 10 × 24 dots
- Print pitch : Column distance 1.5mm
  Row distance 3.75mm
- Print speed : Approximate 50mm/s (13.3 lines/sec)
- Paper feed speed (Manual feed) : Approximate 40mm/s
- Reliability : Mechanism MCBF 5 million lines
  Head life 12.5 million characters
  (at 4 dots/1 character/1 element)
- Paper end sensor : journal side: Yes
  Receipt side: Yes
- Cutter : Manual
- Near end sensor : No

6-2. PAPER

- Paper roll dimension: 44.5 ± 0.5mm in width
  Max. 80mm in diameter
- Paper quality : (Journal/Receipt)
  High-quality paper
  paper thickness: 0.06 to 0.08mm
  Nihon seisi thermal paper : TF50KS-E
  Oji thermal paper : PD150R, PD160R

6-3. LOGO STAMP

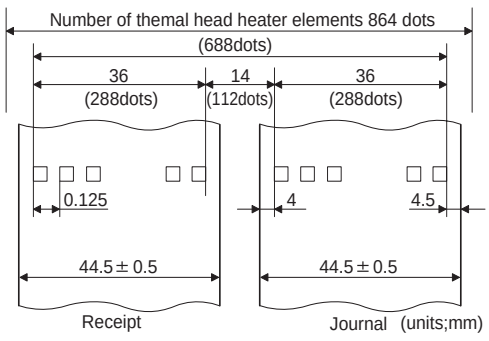
- No

6-4. CUTTER

- Method : Manual

6-5. PRINTING AREA

Receipt & Journal



7. DRAWER

[OUTLINE]

- Standard equipment: Yes
- Max. number of additional drawers: 0
- The drawer consists of:
  1) Drawer box (outer case) and drawer
  2) Coin case (for SEC)
  3) Money case
  4) Lock (attached to the drawer)

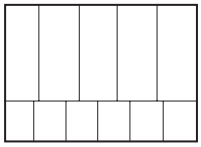
[SPECIFICATION]

7-1. DRAWER BOX AND DRAWER

	XE-A401	XE-A403
Model name of the drawer box	SK423	
Size	420 (W) x 426 (D) x 114 (H) mm	
color	Gray (PB-N8.0)	
Material	Metal	
Release lever	Standard equipment: situated at the bottom	
Bell	–	
Drawer open sensor	–	
Separation from the main unit	–	

7-2. MONEY CASE

	SEC
Separation from the drawer	Allowed
Separation of the bill compartments from the coin compartments	Allowed
Bill separator	Disallowed
Number of compartments	5B/6C



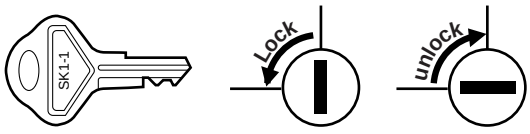
5B/6C

7-3. LOCK (LOCK KEY : LKGIM7331BHZZ)

- Location of the lock: Front
- Method of locking and unlocking:

  To lock, insert the drawer lock key into the lock and turn it 90 degrees counter clockwise.
  To unlock, insert the drawer lock key and turn it 90 degrees clockwise.

- Key No: SK1-1



8. BATTERY

8-1. MEMORY BACK UP BATTERY

Built-in battery: Rechargeable batteries, memory holding time about 1 month (with fully charged built-in batteries, at room temperature)

CHAPTER 2. OPTIONS

1. OPTIONS (NONE)

2. SERVICE OPTIONS (NONE)

3. SUPPLIES

NO	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	Thermal roll paper	TPAPR6645RC05	BA	5 ROLLS/PACK

4. SPECIAL SERVICE TOOLS

NO	NAME	PARTS CODE	PRICE RANK	DESCRIPTION
1	RS-232 Loop-back connector	UKOG-6705RCZZ	BU	

CHAPTER 3. MASTER RESET AND PROGRAM RESET

1. MASTER RESETTING

Master resetting clears the entire memory and resumes initial values.

Master resetting can be accomplished by using the following procedure:

Procedure A:
1) Unplug the AC cord from the wall outlet.
2) Set the mode switch to the PGM position.
3) While holding down both the JOURNAL FEED key and [CL] key, plugin the AC cord to the wall outlet.

The master reset can also be accomplished in the following case.

In case power failure occurs when the machine has no battery attached to it, the master reset operation is automatically performed after the power has been restored.

(This is because if power failure occurs with no battery attached to the machine, all the memories are lost and the machine does not work properly after power recovery; this requires the master reset operation.)

2. PROGRAM RESETTING (INITIALIZATION)

This resetting resumes the initial program without clearing memory.

This resetting can be operated at below sequence in PGM mode.

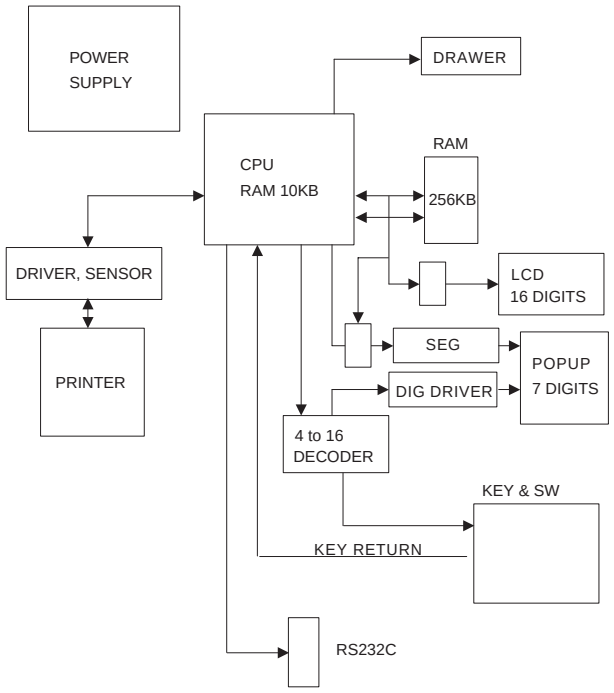
Procedure:
1) Unplug the AC cord from the wall outlet.
2) Set the mode switch to the PGM position.
3) While holding down both JOURNAL FEED key and RECEIPT FEED key, plugin the AC cord to the wall outlet.

Note: In case power failure occurs when the machine has no battery attached to it, the master reset operation is automatically performed after the power has been restored.

CHAPTER 4. HARDWARE DESCRIPTION

1. BLOCK DIAGRAM

XE-A403



CPU

MITSUBISHI M30620SAFP
(INTERNAL RAM 10KB)

EXTERNAL MEMORY

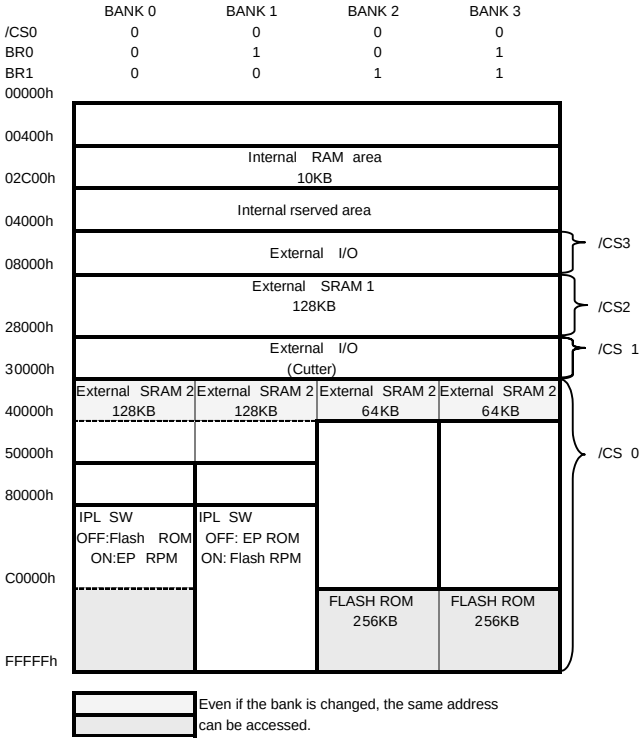
RAM	256KB
FLASH ROM	512KB
	SHARP LH28F004BVT

PRINTER

PR45MII

2. MEMORY MAP

2-1. ADDRESS MAP



Only the /CS0 area (30000h ~ FFFFFh) in the bank is valid.

2-2. EXTERNAL BUS

External BUS ACCESS SPEED

SRAM/EPROM/FLASH ROM ; 2 BCLK
External I/O ; 1 BCLK ∗1BCLK = 83.3ns (at 12MHz)

SRAM
/CS2 area
address 08000h ~ 27FFFh 128KB
Same as ER-A235P
/CS0 area BANK 0
address 30000h ~ 4FFFFh 128KB

FLASH ROM
/CS0 area BANK 0
address 80000h ~ FFFFFh 256KB
(Moves to Bank 1 when rewritten using EPROM)

I/O

3. PRINTER CONTROL

3-1. STEPPING MOTOR CONTROL

The stepping motor is driven at a constant voltage by Sanken STA471A.

1step: 0.125mm, A1dot: 1step

Printing speed 50mm/s

< CPU's PORT >

No.	CPU PORT	Signal to be used
80	P10	RAS
79	P11	RBS
78	P12	RCS
77	P13	RDS
76	P14	JAS
75	P15	JBS
74	P16	JCS
73	P17	JDS

< Driving steps >

RECEIPT MOTOR

	Driver IC input (CPU output)				Motor driving signal			
STEP	RAS	RBS	RCS	RDS	/RPFA	/RPFB	/RPFC	/RPFD
1	H	L	L	H	L	H	H	L
2	L	H	L	H	H	L	H	L
3	L	H	H	L	H	L	L	H
4	H	L	H	L	L	H	L	H

	Driver IC input (CPU output)				Motor driving signal			
STEP	JAS	JBS	JCS	JDS	/JPFA	/JPFB	/JPFC	/JPFD
1	L	H	H	L	H	L	L	H
2	L	H	L	H	H	L	H	L
3	H	L	L	H	L	H	H	L
4	H	L	H	L	L	H	L	H

∗When the motor is at rest, the same phase as the final excitation phase is RUSH energize for 10 ms to turn off all phases. → Turn all RAS ~ RDS and JAS ~ JDS into L.

No energizing should be allowed at lease 30 ms after stopping the motor before restarting.

When starting the motor, the first excitation phase is RUSH energized for 10 ms to start the motor.

3-2. HEAD CONTROL

HEAD:832 dots in all. Printable range: 384 dots at receipt side; 384 dots at journal side

Related PORT

No.	CPU PORT	Signal to be used
30	TXD2	SO
29	RXD2	SI
28	CLK2	PCLK
93	P103	/STRB1
92	P104	/STRB2
91	P105	/STRB3
90	P106	/STRB4
89	P107	LATCH
21	P81	VHCOM

/STB1: 1 ~ 288dot: 288 dots in all
/STB2: 289 ~ 432dot: 144 dots in all
/STB3: 433 ~ 576dot: 144 dots in all
/STB4: 577 ~ 864dot: 288 dots in all
Total 864 dots

∗When turning on or off the printer power supply, make sure to turn /STB1, 2, 3, 4 to "H".

∗Do not turn on without paper.

∗THERMAL HEAD power supply control : Turns ON when P81= "H"; turns OFF when "L". (The power supply for HEAD and STEPPING MOTOR is shared). When printing is finished (when the motor is stopped) Athe power should be turned OFF.

∗Before printing or feeding paper, perform A/D conversion in ∗∗ ms after the printer head is turned ON and make sure the voltage is stable.
(The power supply of the printer head should be turned ON and OFF by using the regulator IC.)

4. I/O

M16C/24 PORT MEMORY SPACE: NORMAL MODE
PROCESSOR MODE: MICRO PROCESSOR MODE
It is used by (SEPARATE BUS 8bit Width)

PORT	PIN No.	I/O	Pin name	Signal name	Initial value	OFF MODE	Function	PORT	PIN No.	I/O	Pin name	Signal name	Initial value	OFF MODE	Function
P00	88	I/O		D0		Out L		P54	42	O	/HLDA	(NU)		Out L	
P01	87	I/O	D1	D1		Out L		P55	41	I	/HOLD	/HOLD		In	
P02	86	I/O	D2	D2		Out L		P56	40	O	ALE	(NU)		Out L	
P03	85	I/O	D3	D3		Out L		P57	39	I	/RDY	/RDY		In	
P04	84	I/O	D4	D4		Out L		P60	38	O	P60	DR1	L	Out L	DRAWER 1 DRIVE SIGNAL
P05	83	I/O	D5	D5		Out L		P61	37	O	CLK0	FSCK(NU)	L	Out L	FMC FSCK
P06	82	I/O	D6	D6		Out L		P62	36	I	RXD0	FRD(NU)	L	Out L	FMC FRD
P07	81	I/O	D7	D7		Out L		P63	35	O	TXD0	FSD (NU)	L	Out L	FMC FSD
P10	80	O	P10	RAS	L	Out L	RECEIPT PAPER FEED A	P64	34	O	/RTS1	/RS	H	Out L	RS-232 /RS
P11	79	O	P11	RBS	L	Out L	RECEIPT PAPER FEED B	P65	33	O	P65	/FRES(NU)	L	Out L	FMC /FRES
P12	78	O	P12	RCS	L	Out L	RECEIPT PAPER FEED C	P66	32	I	RXD1	RD		In	RS-232 RD
P13	77	O	P13	RDS	L	Out L	RECEIPT PAPER FEED D	P67	31	O	TXD1	SD	H	Out L	RS-232 SD
P14	76	O	P14	JAS	L	Out L	JOURNAL PAPER FEED A	P70	30	O	TXD2	SO	L	Out L	PRINTER DATA OUT
P15	75	O	P15	JBS	L	Out L	JOURNAL PAPER FEED B	P71	29	I	RXD2	SI		In	PRINTER DATA IN
P16	74	O	P16	JCS	L	Out L	JOURNAL PAPER FEED C	P72	28	O	CLK2	PCLK	L	Out L	PRINTER CLOCK
P17	73	O	P17	JDS	L	Out L	JOURNAL PAPER FEED D	P73	27	O	P73	DR2	L	Out L	DRAWER 2 DRIVE SIGNAL
P20	72	O	A0	A0		Out L		P74	26	O	P74	/ER	H	Out L	RS-232 /ER
P21	71	O	A1	A1		Out L		P75	25	I	P75	/CD		In	RS-232 /CD
P22	70	O	A2	A2		Out L		P76	24	I	P76	/CS		In	RS-232 /CS
P23	69	O	A3	A3		Out L		P77	23	I	P77	/DR		In	RS-232 /DR
P24	68	O	A4	A4		Out L		P80	22	O	P80	BUZZER	L	Out L	
P25	67	O	A5	A5		Out L		P81	21	O	P81	VHCOM	L	In	PRINTER HEAD CONTROL
P26	66	O	A6	A6		Out L		P82	20	I	/INT0	POFF		In	
P27	65	O	A7	A7		Out L		P83	19	I	/INT1	/FRDY(NU)	L	Out L	FMC /FRDY
P30	63	O	A8	A8		Out L		P84	18	O	P84	/BUSY(NU)	L	Out L	FMC #BUSY
P31	61	O	A9	A9		Out L		P85	17	I	/NMI	/NMI(NU)		In	
P32	60	O	A10	A10		Out L		P86	11	O	XCOUT	XCOUT			32.768kHz
P33	59	O	A11	A11		Out L		P87	10	I	XCIN	XCIN			32.768kHz
P34	58	O	A12	A12		Out L		P90	7	I	P90	MODE		In	MODE KEY SENSE
P35	57	O	A13	A13		Out L		P91	6	I	P91	MSENS		In	MISCELLANEOUS SENSE
P36	56	O	A14	A14		Out L		P92	5	O	P92	BA1	L	Out L	BANK signal 1
P37	55	O	A15	A15		Out L		P93	4	O	P93	BA0	L	Out L	BANK signal 0
P40	54	O	A16	A16		Out L		P94	3	O	P94	DATA /CE	L	Out L	LCD DATA LATCH signal
P41	53	O	A17	A17		Out L		P95	2	O	P95	BLON	L	Out L	BACK LIGHT ON
P42	52	O	A18	A18		Out L		P96	1	O	P96	LCDON	L	Out L	LCD POWER ON
P43	51	O	A19	A19		Out L		P97	100	I	P97	IPLON		In	IPL ON signal
P44	50	O	/CS0	/CS0		Out H		P100	97	I	AN0	TM		In	HEAD temperature monitor
P45	49	O	/CS1	/CS1		Out L		P101	95	I	AN1	VPTEST		In	HEAD voltage monitor
P46	48	O	/CS2	/CS2		Out H		P102	94	I	AN2	VREF		In	Referance voltage
P47	47	O	/CS3	/CS3		Out L		P103	93	O	AN3	/STRB1	H	In	PRINTER STORE SIGNAL 1
P50	46	O	/WR	/WR		Out L		P104	92	O	AN4	/STRB2	H	In	PRINTER STORE SIGNAL 2
P51	45	O	/BHE	(NU)		Out L		P105	91	O	P105	/STRB3	H	In	PRINTER STORE SIGNAL 3
P52	44	O	/RD	/RD		Out L		P106	90	O	P106	/STRB4	H	In	PRINTER STORE SIGNAL 4
P53	43	O	BCLK	BCLK		Out L		P107	89	O	P107	LATCH	L	In	PRINTER LATCH SIGNAL

Power supply/CONTROL pins

PORT	PIN No.	I/O	Pin name	Function	PORT	PIN No.	I/O	Pin name	Function
BYTE	8	I	BYTE	Connected to VCC	Vcc	62		Vcc	Connected to VCC
CNVss	9	I	CNVss	Connected to GND	Vss	64		Vss	connected to GND
/RESET	12	I	/RESET		AVss	96		AVss	Connected to GND
Xout	13	O	Xout	OPEN	Vref	98		Vref	Connected to VCC
Vss	14		Vss	Connected to GND	AVcc	99		AVcc	Connected to VCC
Xin	15	I	Xin	connected to Spectram diffusion IC					
Vcc	16		Vcc	Connected to VCC					

5. KEY-DISPLAY

5-1. LCD CONTROL

Basically the same as the ER-A275P.

LCD-related registers

Function	Address	R/W
LCD Write Data	04001h	W
LCD Read Data	04002h	R
LCD Control Signal / Key Strobe Signal	04003h	W
Data Latch Signal	CPU port P94	W

< LCD Control Signal / Key Strobe Signal >

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04003h	–	E	R/W	RS	KS3	KS2	KS1	KS0

Bit7 : Not used

Bit6 : E
Enable Signal ┘‾└ Enable

Bit5 : R/W
H : Data read L : Data Write

Bit4 : RS
H : Data input L : Instruction Input

< Data Latch Signal >

L : LCD write data latch

5-2. KEY/DISPLAY SCAN

On the A403, the key and display scan signal is common.

KEY/display SCAN and key read should be performed at the following timing.

① KEY/display SCAN cycle: 10ms

② Blanking time: 50us

③ KEY DATA READ timing: More than 10 ms from the fall of the SCAN signal

Key / Display-related registers

Function	Address	R/W
LED Segment Signal	04000h	W
LCD Control Signal / Key Strobe Signal	04003h	W
Key Return Signal	04003h	R

< LED Segment Signal >

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04000h	dp	g	f	e	d	c	b	a

< LCD Control Signal / Key Strobe Signal >

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04003h	-	E	R/W	RS	KS3	KS2	KS1	KS0

Bit3 ~ 0 : KS3 ~ 0

Strobe signals for keys and POP UP Display are generated at KS3 - 0.

< Key Return Signal >

Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
04003h	KR7	KR6	KR5	KR4	KR3	KR2	KR1	KR0

5-3. KEYSCAN MATRIX

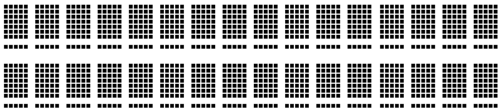
Others

	CPU	STO	ST1	ST2	ST3	ST4	ST5	ST6	ST7	ST8	ST9
MODE	P90	SRV	PGM		Time	REG	MGR	X1/Z1	X2/Z2		
Others	P91	PF-R	PF-J	RPE	HEAD UP	JPE		DRAWER OPEN	MRS	RS/CI	

5-4. DISPLAY

The A403 has an LCD display, 5 x 7 dots, 2 lines, at the front side and a 7-digit LED at the pop-up side.

FRONT:



POP UP:

- Display DIGIT signal

  The above ST0 ~ ST6 are display digit signals.

  ST0: 1st digit ~ ST6: 7th digit

- Display SEGMENT signal

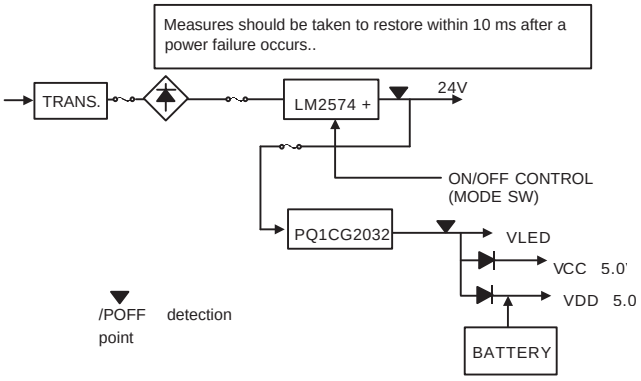
  The LED segment signal is outputted by writing SEGMENT data in the /CS3 space.

  Correspondence of DATA ~ SEGMENT

  D0 ~ D6 → A ~ g

  D7 → DP

6. POWER SUPPLY



7. REWRITING FLASH MEMORY

IPL from COM: Data from the PC is written to flash ROM through the COM port. (Max. 38.4 kbps)

8. DRAWER

The A403 has a 1 channel of drawer port. (+ 1 channel is reserved for the CPU PORT) O R No open sensor is provided.

The driving time for the DRAWER solenoid are as follows: 50ms (max) 45ms (min)

9. PRINT RATE

384 dots/1 line

10. A/D CONVERSION

The printer power supply voltage should be measured at more than 10 ms after the printer is turned ON.

11. BUZZER

PIEZO type BUZZER

The oscillating frequency is 4.0kHz ± 0.5kHz

12. RESET

The RESET signal is generated when:

1) The mode key switch is turned from SRV to a position other than SRV'(excluding OFF).
2) The power is turned ON more than 10 seconds after the power is turned OFF. (The reset signal may not be issued if the POWER-OFF time is short.)
3) The mode key switch is turned from OFF to a position other than OF (excluding the SRV position). (If the power-off time is less than 5 seconds, the reset signal may not be issued.)

CHAPTER 5. DIAGNOSTIC PROGRAM

1. TEST ITEMS

The test items are as follows:

	Code	Description
1)	100	Display buzzer test
2)	101	Key code
3)	102	Printer test
4)	104	Keyboard test
5)	105	Mode switch test
6)	106	Printer sensor test
7)	107	Clock display test
8)	110	Drawer 1 open & sensor test
9)	120	External RAM test
10)	121	CPU internal RAM test
11)	130	FLASH ROM test
12)	160	AD conversion port test
13)	500	RS232C test

∗Starting DIAG.

Mode switch: PGM
Key operation: Above code + “PO” key

2. DESCRIPTION OF EACH DIAG PROGRAM

1) DISPLAY BUZZER TEST

① Key operation

100 → RCPT/PO

② Test procedure

OP display

D	I	S	P		B	U	Z	Z	E	R		P	G	M	
0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Rear display 4.5.6.7.8.9.0.

The decimal point on the LED and the cursor on the LCD will shift from the lower digit to the upper digit in steps of 1 digit (every 200 msec)
After that, all segments will turn on (about 1 sec)
These two modes are repeated.
At the same time, the buzzer sounds continuously.

③ Check that:

A) Each position is correctly displayed.

B) The brightness of each number is uniform.

C) The buzzer sound is normal.

④ End of testing

You can exit the test mode by pressing any key. The following is printed.

1 0 0

2) KEY CODE

① Key operation

101 → RCPT/PO

② Test procedure

OP display

K	E	Y		C	O	D	E					P	G	M	
													○	○	○

KEY CODE

③ Check that:

KEY code : Every time a key is pressed, the hard code of that key is displayed as a decimal number.
When a key is pressed twice or pressed in an incorrect manner, --- will be displayed.

④ End of testing

You can exit the test mode by turning the mode switch to a position other than the PGM mode. The printer prints as follows:

1 0 1

3) PRINTER TEST

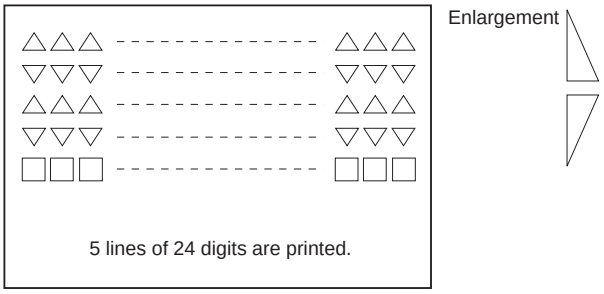
① Key operation

102 → RCPT/PO

② Test procedure

OP display

R	/	J		P	R	I	N	T	E	R		P	G	M	



At the receipt side, the logo is also printed and the receipt is issued.

③ Check that:

The print is free from contamination, blur, and uneven density.

④ End of testing

The test will end automatically.

4) KEYBOARD TEST

① Key operation

_ _ _ _104 → RCPT/PO

↑

KEY check sum code

② Test procedure

The keyboard is checked using the sum check code of the key code.

If the sum check code is not entered, the check is made using the sum check code of the default keyboard arrangement

The sum check data for each model is entered to the front 4 digits of the DIAG code, and that data is compared with the key data added until the final key (CA/AT) is pressed.

Both data are the same, the test ends, printing the number given below.

If both data are different, the printer prints the error message.

OP display

K	E	Y		B	O	A	R	D				P	G	M	
1	0	4											○	○	○

KEY CODE

③ Check:

A) The content of completion print

④ End of testing

When the test ends normally: **1 0 4**

When an error occurs: E – ~ – **1 0 4**

Note: Calculation of key sum check data

Hard codes (hexadecimal number) at the position (excluding feed key) where there is an input data contact are added.

However, the end key (TL) is not added.

This data to which hard codes have been added is converted into a decimal number value, which will become the sum check data that will be entered when DIAG is started.

5) MODE SWITCH TEST

① Key operation

105 → RCPT/PO

② Test procedure

OP display

M	O	D	E		S	W					P	G	M	
1	0	5												X

MODE: PGM_VOID_OFF_OP X/Z_REG_MGR_X1/Z1_X2/Z2__PGM

X : 1 2 9 3 4 5 6 7 1

The above X must be read in the correct order. (If the contact is open, 9 will be displayed.)

③ Check:

The display during testing and the content of the completion print.

④ End of testing

When the test ends normally **1 0 5**

When an error occurs: E – ~ – **1 0 5**

6) PRINTER SENSOR TEST

① Key operation

106 → RCPT/PO

② Test procedure

Check the status of the paper end sensor and head up sensor.

OP display

R	/	J		S	E	N	S	O	R			P	G	M	
1	0	6											X	–	Y

③ Check the following.

X: 1 - Paper present at the receipt side
O - No paper at the receipt side

Y: 1 - Paper present at the journal side
O - No paper at the journal side

④ End of testing

You can exit the test mode by pressing any key and the printer prints the following.

1 0 6

7) CLOCK TEST

① Key operation

107 → RCPT/PO

② Test procedure

OP display

T	I	M	E	R		C	H	E	C	K		P	G	M	
1	0	4						*	*	–	*	*		*	*

Hour Min. Sec.

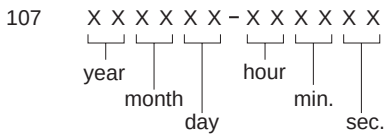
Blinks at an interval of 0.5 sec.

③ Check that:

"–" blinks and the clock counts up.

④ End of testing

When any key is pressed, the date and time are printed and the test mode will be terminated.



8) DRAWER 1 OPEN & SENSOR TEST

① Key operation

110 → RCPT/PO

② Test procedure

OP display

D	R	A	W	E	R		1					P	G	M	
															X

X : O = DRAWER OPENED
C = DRAWER CLOSED

③ Check that:

A) The drawer 1 opens normally.

B) The sensor correctly indicates the status of the drawer 1.

∗ On the XE-A403, “C” (CLOSED) is always displayed.

④ End of testing

You can exit the test mode by pressing any key. The printer prints the following.

1 1 0

9) EXTERNAL RAM TEST

① Key operation

120 → RCPT/PO

② Test procedure

The standard 256 Kbyte RAM is checked.

The contents of memory must be stored before and after this test.

RAM (08000H ~ 27FFFH area and 40000H ~ 5FFFFH area) is tested in the following procedure:

a) Store data in the test areas
b) Write “00H”
c) Read and compare “00H” and then write”55H”
d) Read and compare “55H” and then write “AAH”
e) Read and compare “AAH”
f) Restore stored data

If an error occurs at a step, the error is printed.

If any error does not occur, the following addresses are checked in turns.

Addresses to be checked:

10000H , 10001H , 10002H , 10004H , 10008H ,
10010H , 10020H , 10040H , 10080H ,
10100H , 10200H , 10400H , 10800H ,
11000H , 12000H , 14000H , 18000H ,
20000H
40000H , 40001H , 40002H , 40004H , 40008H ,
40010H , 40020H , 40040H , 40080H ,
40100H , 40200H , 40400H , 40800H ,
41000H , 42000H , 44000H , 48000H ,
50000H

OP display

R	A	M									P	G	M	
1	2	0												

③ Check:

A) The completion print.

④ End of testing

The program ends after printing as follows:

When the test ends normally: 120
When the test end abnormally: Ex – ~ – 120
∗∗∗∗∗
x = 1:Data error
x = 2:Address error

When an error occurs, the printer outputs the error message and the address where the error has occurred in the area ∗∗∗∗∗.

10) CPU INTERNAL RAM TEST

① Key operation

121 → RCPT/PO

② Test procedure

The test program tests internal RAM (10 Kbytes) of the CPU.

The contents of memory must be stored before and after this test.

RAM (00400H ~ 02BFFH area) is tested in the following procedure.

a) Store data in the test area.
b) Write “00H”
c) Read and compare “00H” and then write “55H”
d) Read and compare “55H” and then write “AAH”
e) Read and compare “AAH”
f) Restore stored data

If an error occurs at a step, the error is printed.
If any error does not occur, the following addresses are checked in turns.

Addresses to be checked:

01000H , 01001H , 01002H , 01004H , 01008H
01010H , 01020H , 01040H , 01080H ,
01100H , 01200H , 01400H , 01800H ,
02000H

OP display

C	P	U		R	A	M					P	G	M	
1	2	1												

③ Check:

The completion print.

④ End of testing

The test program ends after printing.

When the test ends normally: 121
When the test ends abnormally: Ex – ~ – 121
∗∗∗∗∗
x = 1:Data error
x = 2:Address error

If an error occurs, the printer outputs the error message and the address where the error has occurred in the area ∗∗∗∗∗.

11) FLASH ROM TEST

① Key operation

130 → RCPT/PO

② Test procedure

The test program checks that the checksum of the flash ROM (BANK0F80000H ~ FFFFFH).

The lower two digits of the checksum should be 10H.

OP display

F	L	A	S	H		R	O	M				P	G	M	
1	3	0													

③ Check:

The completion print.

④ End of testing

The test will automatically be terminated and the printer prints as follows:

When the test ends normally:		130
	ROM	******** (Model name)
		******** (Version)
When the test ends abnormally:	E – – ~ – –	130
	ROM	******** (Model name)
		******** (Version)

12) AD CONVERSION PORT TEST

① Key operation

160 → RCPT/PO

② Test procedure

The test program displays the voltage of each AD conversion port.

Display

OP display

T	M					=	*	*	*	*		P	G	M	
1	6	0													

↓

OP display

V	R	F				=	*	*	*	*		P	G	M	
1	6	0													

↓

OP display

V	P	T	E	S	T	=	*	*	*	*		P	G	M	
1	6	0													

↓

End of testing

13) RS232C TEST

Install the RS232C loopback connector.

① Key operation

500 → RCPT/PO

② Test procedure

The test program checks the control signals.

OUTPUT		INPUT			
/ER	/RS	/DR	/CI	/CD	/CS
OFF	OFF	OFF	OFF	OFF	OFF
OFF	ON	OFF	OFF	ON	ON
ON	OFF	ON	ON	OFF	OFF
ON	ON	ON	ON	ON	ON

Data communication check

A loopback test of 256-byte data between is performed.

DATA: $00 - $FF BAUD RATE :9600 BPS

OP display

R	S	2	3	2	C		T	E	S	T		P	G	M	
5	0	0													

③ Check:

The completion print.

④ End of testing

Completion print	RS TEST	OK
Error print	RS TEST	**NG**ERxx

xx	Contents of error	
01	ER DR error	
02	ER CI error	
03	RS CD error	
04	RS CD error	
05	SD RD error	DATA error
06	SD RD error	DATA error/framing error

3. KEY CODE TABLE

XE–A403

					083	067	147	148		003	004
↑ RF	↑ JF	052	132	116	084	068	146	018		002	005
033	037	050	130	114	082	066	149	145		017	001
032	048	053	133	117	085	069	065	064		016	000
038	054	128	129	113	081	080	086	070		022	006
039	055	118		112	102	103	087	071		007	

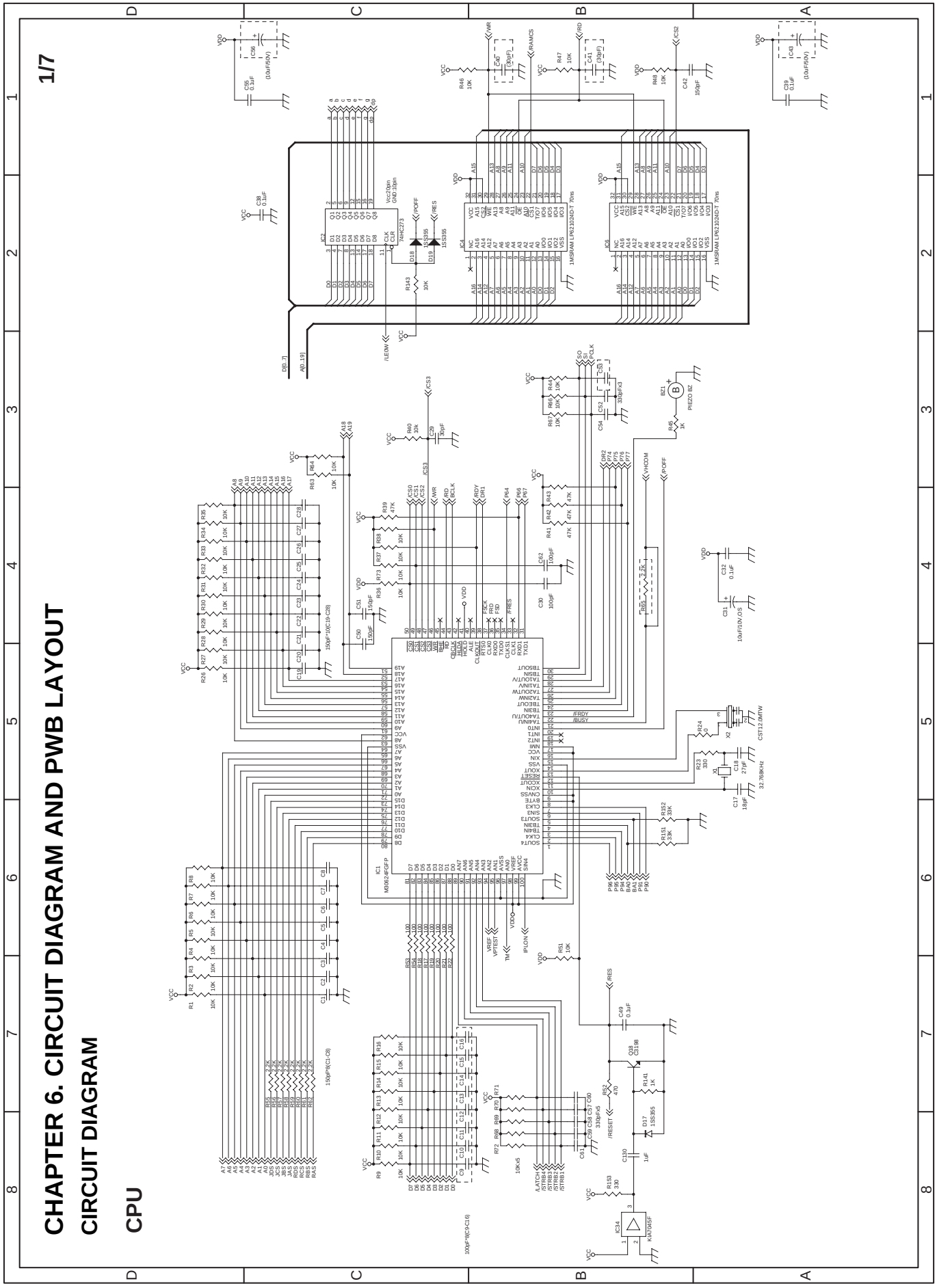
CHECK SUM : 4 0 7 5

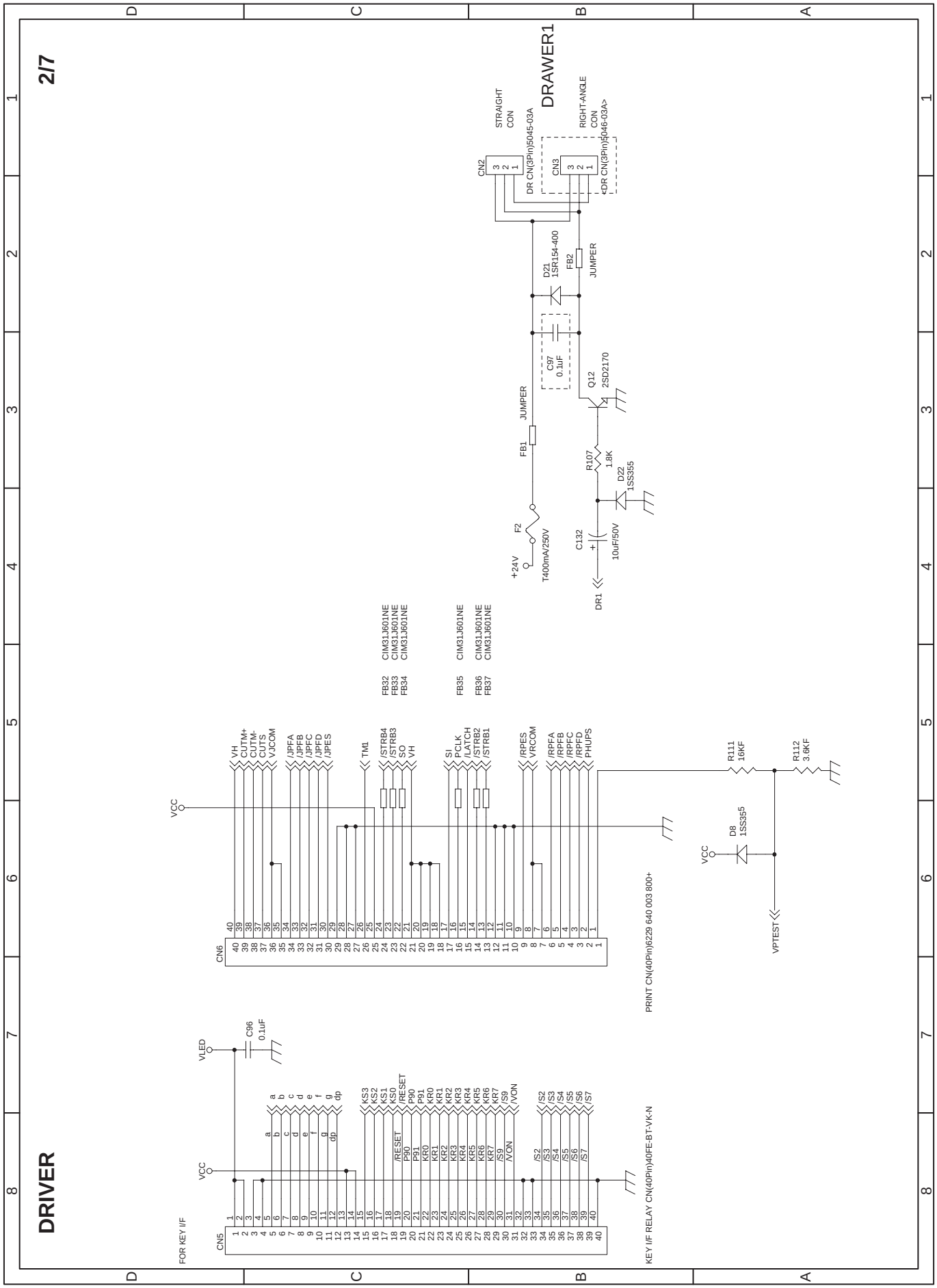
CHAPTER 6. CIRCUIT DIAGRAM AND PWB LAYOUT

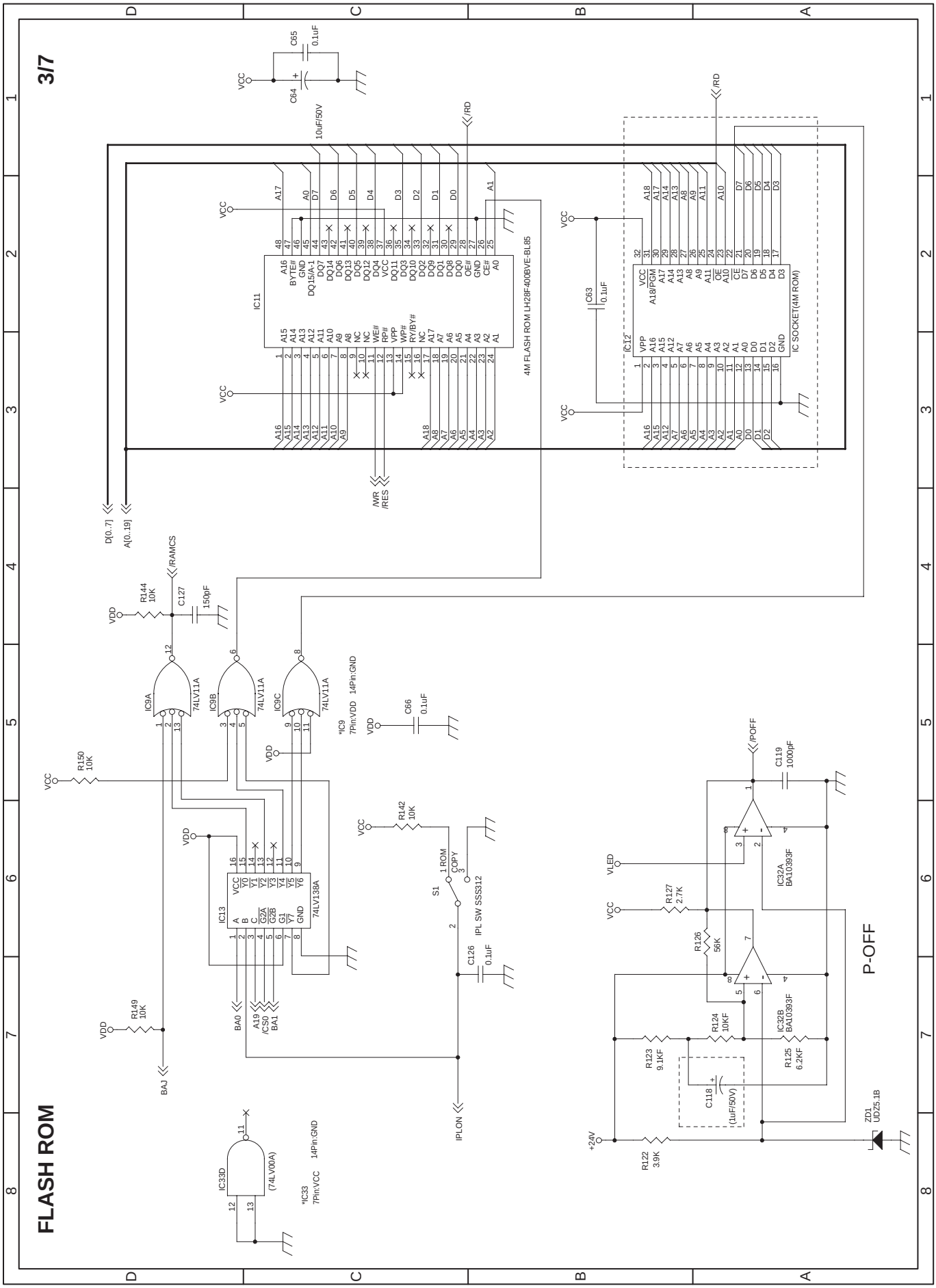
CIRCUIT DIAGRAM

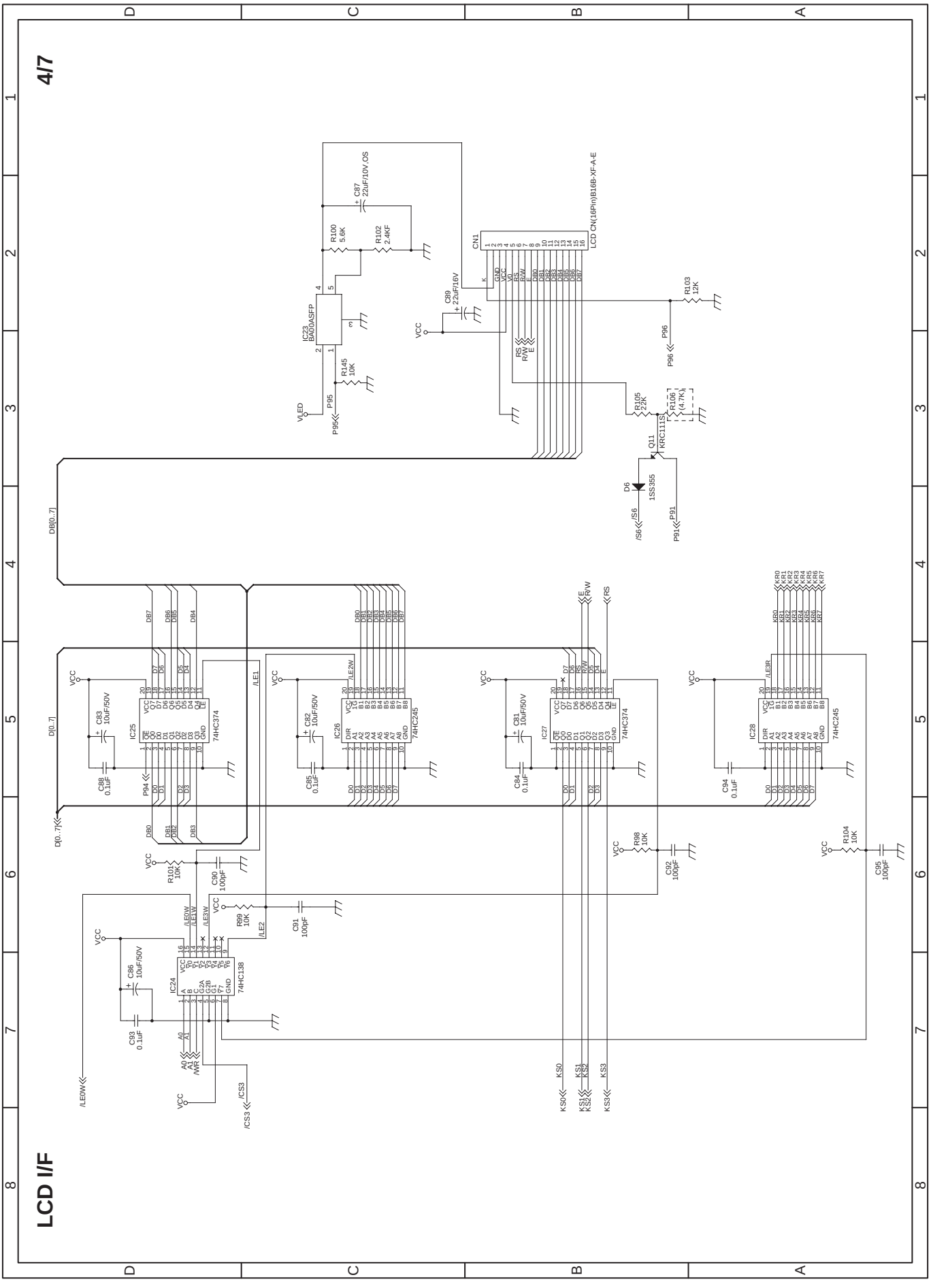
CPU

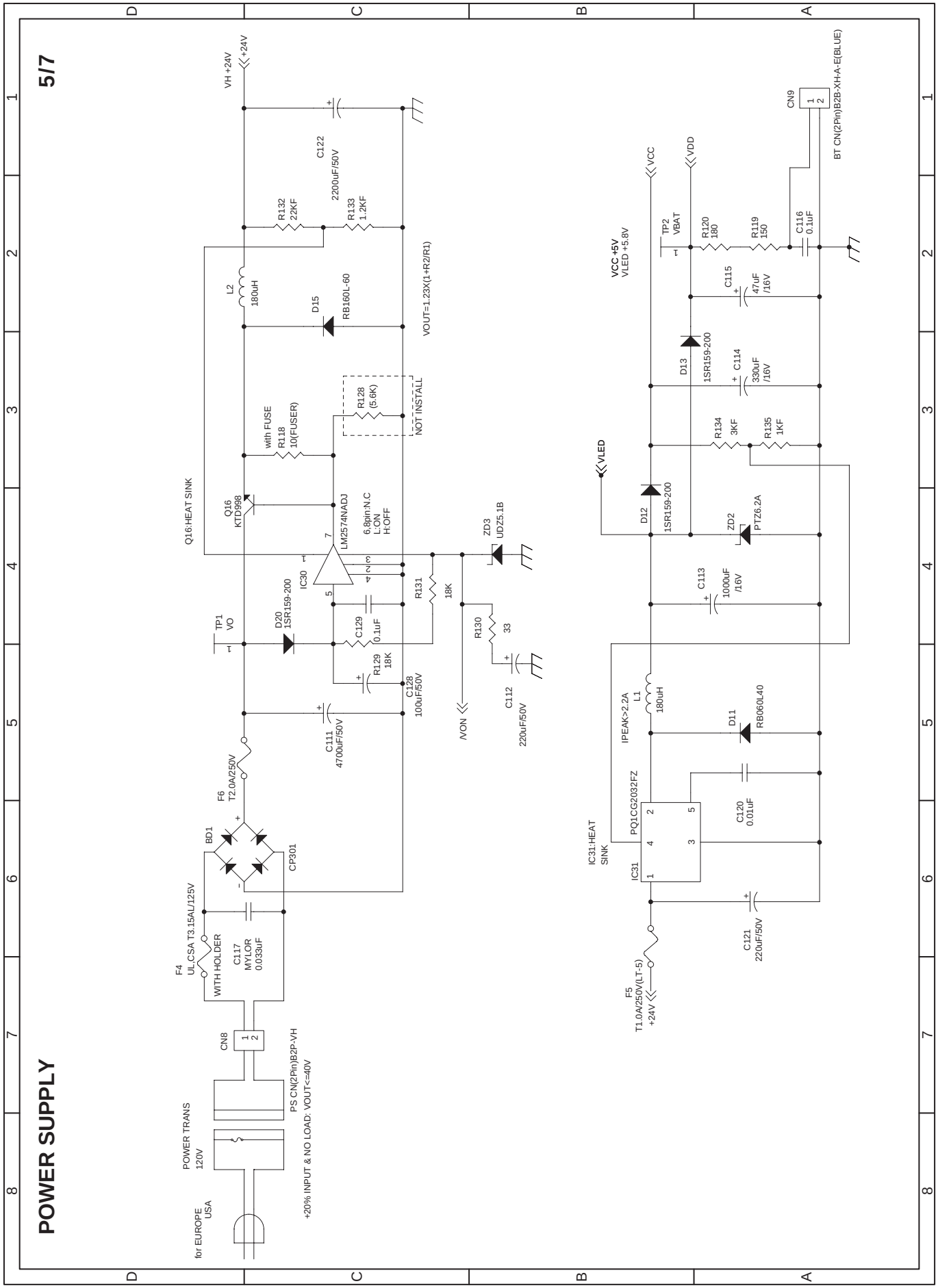
1/7

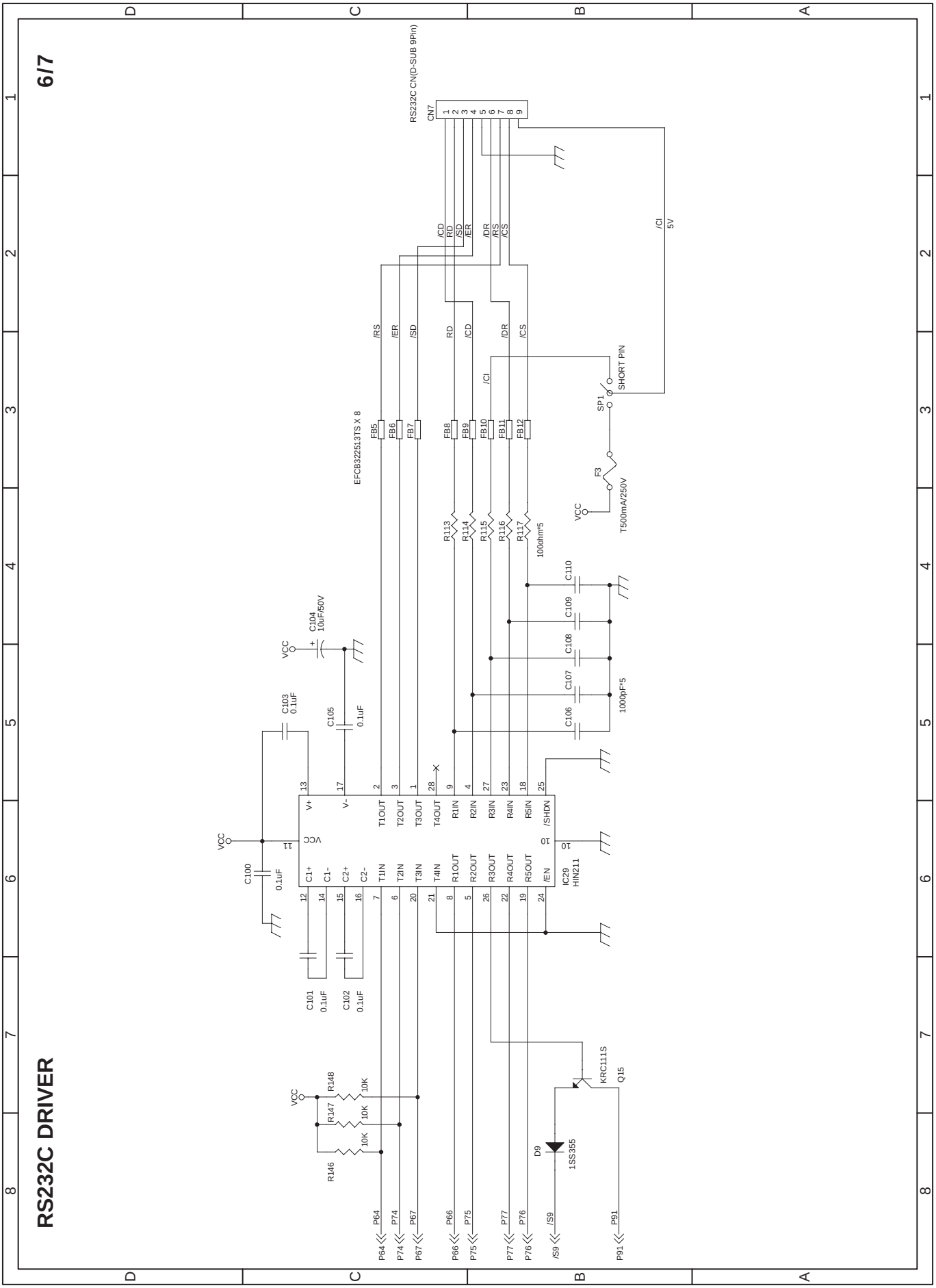


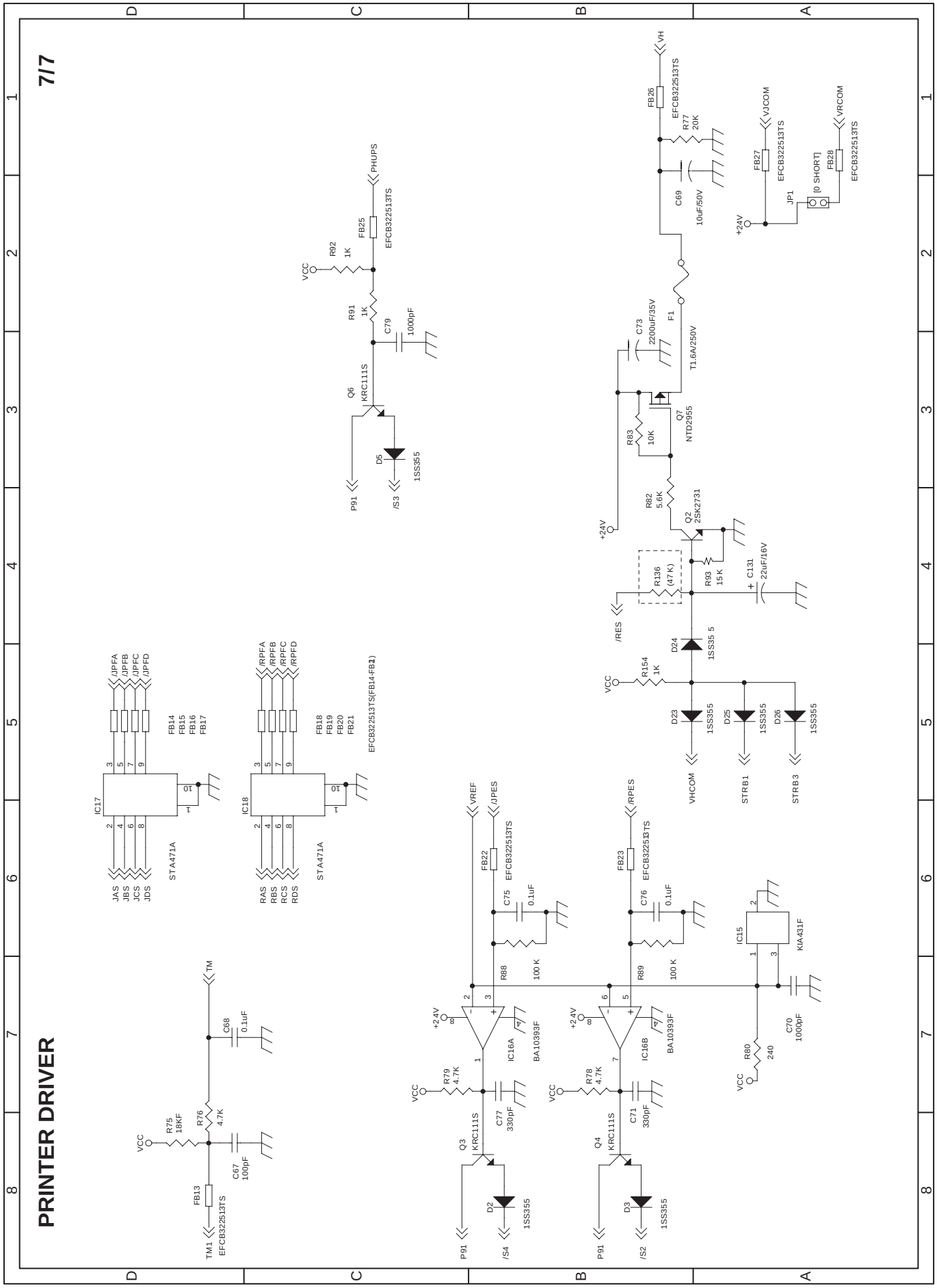

2/7
DRIVER
DRAWER1
STRAIGHT CON
RIGHT-ANGLE CON
DR CN(3Pin)5045-03A
<DR CN(3Pin)5046-03A>
CN2
CN3
D21 1SR154-400
FB2 JUMPER
C97 0.1uF
Q12 2SD2170
FB1 JUMPER
R107 1.8K
D22 1SS355
F2 T400mA/250V
+24V
C132 10uF/50V
DR1
FB32 FB33 FB34 CIM31J601NE
FB35 CIM31J601NE
FB36 FB37 CIM31J601NE
CN6
VH CUTM+ CUTM- CUTS VJCOM
/JPFA /JPFB /JPFC /JPFD /JPES
TM1
/STRB4 /STRB3 SO VH
SI PCLK /LATCH /STRB2 /STRB1
/RPES VRCOM
/RPFA /RPFB /RPFC /RPFD PHUPS
PRINT CN(40Pin)6229 640 003 800+
R111 16KF
R112 3.6KF
D8 1SS355
VPTEST
VCC
VLED
C96 0.1uF
CN5
FOR KEY I/F
a b c d e f g dp
KS3 KS2 KS1 KS0 /RESET P90 P91 KR0 KR1 KR2 KR3 KR4 KR5 KR6 KR7 /S9 /VON
/S2 /S3 /S4 /S5 /S6 /S7
KEY I/F RELAY CN(40Pin)40FE-BT-VK-N

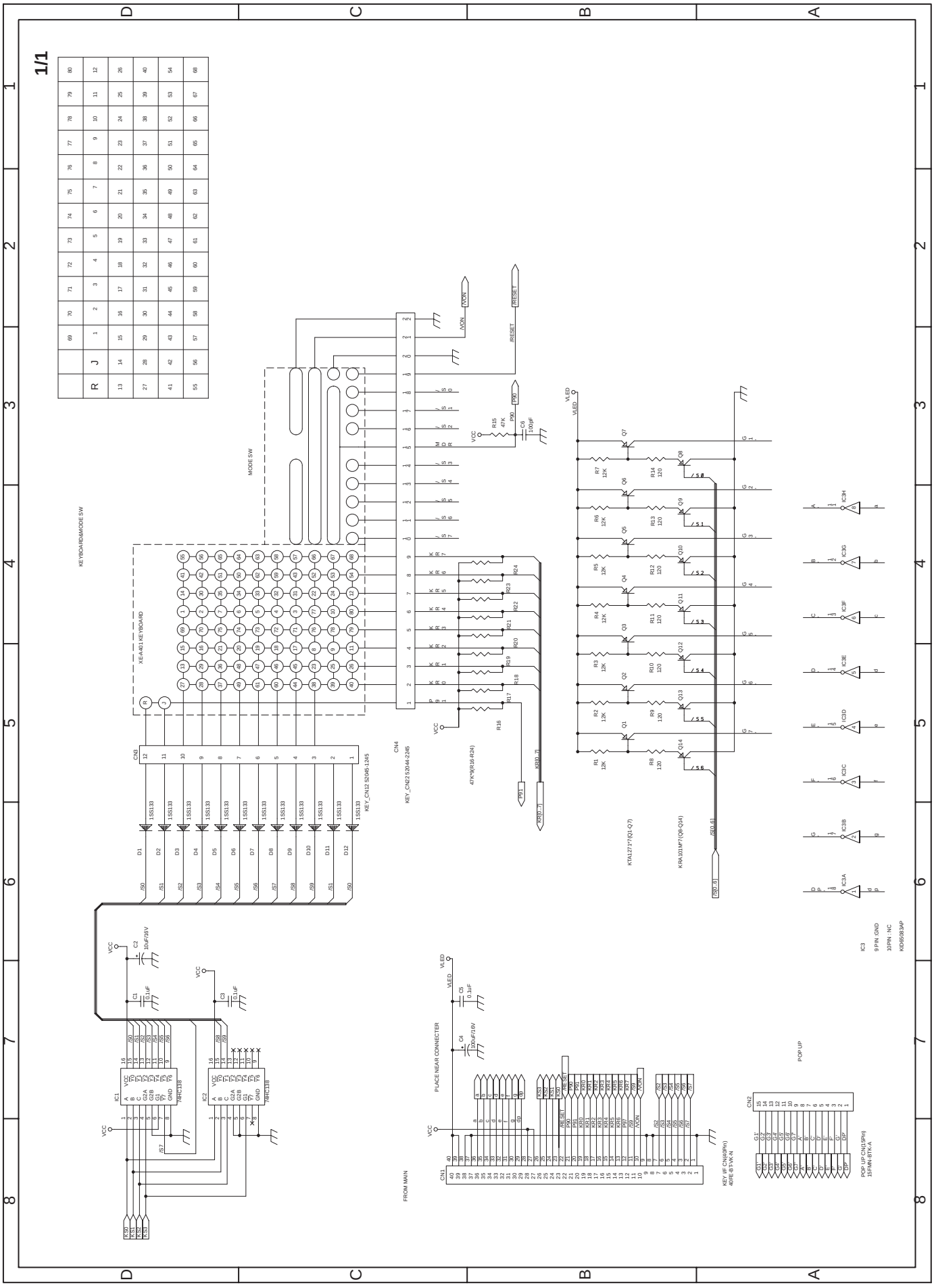

3/7
FLASH ROM
P-OFF
4M FLASH ROM LH28F400BVE-BL85
IC SOCKET(4M ROM)
74LV11A
74LV138A
BA10393F
IPL SW SSS312
D[0..7]
A[0..19]
/RD
/WR
/RES
/RAMCS
/POFF
VLED
IPLON
BAJ
BA0
BA1
A19
/CS0
+24V
VCC
VDD
1ROM
COPY
IC9A
IC9B
IC9C
IC11
IC12
IC13
IC32A
IC32B
IC33D
*IC9 7Pin:VDD 14Pin:GND
*IC33 7Pin:VCC 14Pin:GND
(74LV00A)
R122 3.9K
R123 9.1KF
R124 10KF
R125 6.2KF
R126 56K
R127 2.7K
R142 10K
R144 10K
R149 10K
R150 10K
C63 0.1uF
C64 10uF/50V
C65 0.1uF
C66 0.1uF
C118 (1uF/50V)
C119 1000pF
C126 0.1uF
C127 150pF
S1
ZD1 UDZ5.1B


4/7
LCD I/F
LCD CN(16Pin)B16B-XF-A-E
CN1
IC23 BA00ASFP
R100 5.6K
R102 2.4KF
C87 22uF/10V.OS
R145 10K
C89 22uF/16V
R103 12K
R105 22K
R106 (4.7K)
Q11 KRC111S
D6 1SS355
VLED
P95
P96
P91
/S6
RS
R/W
E
DB[0..7]
D[0..7]
IC25 74HC374
IC26 74HC245
IC27 74HC374
IC28 74HC245
IC24 74HC138
C83 10uF/50V
C82 10uF/50V
C81 10uF/50V
C86 10uF/50V
C88 0.1uF
C85 0.1uF
C84 0.1uF
C93 0.1uF
C94 0.1uF
C90 100pF
C91 100pF
C92 100pF
C95 100pF
R101 10K
R99 10K
R98 10K
R104 10K
/LE1
/LE2
/LE1W
/LE2W
/LE3W
/LE3R
A0
A1
/WR
/CS3
KS0
KS1
KS2
KS3
KR0
KR1
KR2
KR3
KR4
KR5
KR6
KR7
VCC
GND


POWER SUPPLY
5/7
for EUROPE
USA
POWER TRANS
120V
+20% INPUT & NO LOAD: VOUT<=40V
PS CN(2Pin)B2P-VH
CN8
F4
UL,CSA T3.15AL/125V
WITH HOLDER
C117
MYLOR
0.033uF
BD1
CP301
F6
T2.0A/250V
C111
4700uF/50V
C128
100uF/50V
VH +24V
+24V
C122
2200uF/50V
R132
22KF
R133
1.2KF
L2
180uH
D15
RB160L-60
VOUT=1.23X(1+R2/R1)
R128
(5.6K)
NOT INSTALL
with FUSE
R118
10(FUSER)
Q16:HEAT SINK
Q16
KTD998
IC30
LM2574NADJ
6.8pin:N.C
L:ON
H:OFF
ZD3
UDZ5.1B
TP1
VO
D20
1SR159-200
C129
0.1uF
R129
18K
R131
18K
R130
33
C112
220uF/50V
/VON
CN9
BT CN(2Pin)B2B-XH-A-E(BLUE)
VCC
VDD
VCC +5V
VLED +5.8V
TP2
VBAT
R120
180
R119
150
C116
0.1uF
C115
47uF
/16V
D13
1SR159-200
C114
330uF
/16V
R134
3KF
R135
1KF
VLED
D12
1SR159-200
ZD2
PTZ6.2A
C113
1000uF
/16V
IC31:HEAT
SINK
IC31
PQ1CG2032FZ
IPEAK>2.2A
L1
180uH
D11
RB060L40
C120
0.01uF
C121
220uF/50V
F5
T1.0A/250V(LT-5)
+24V

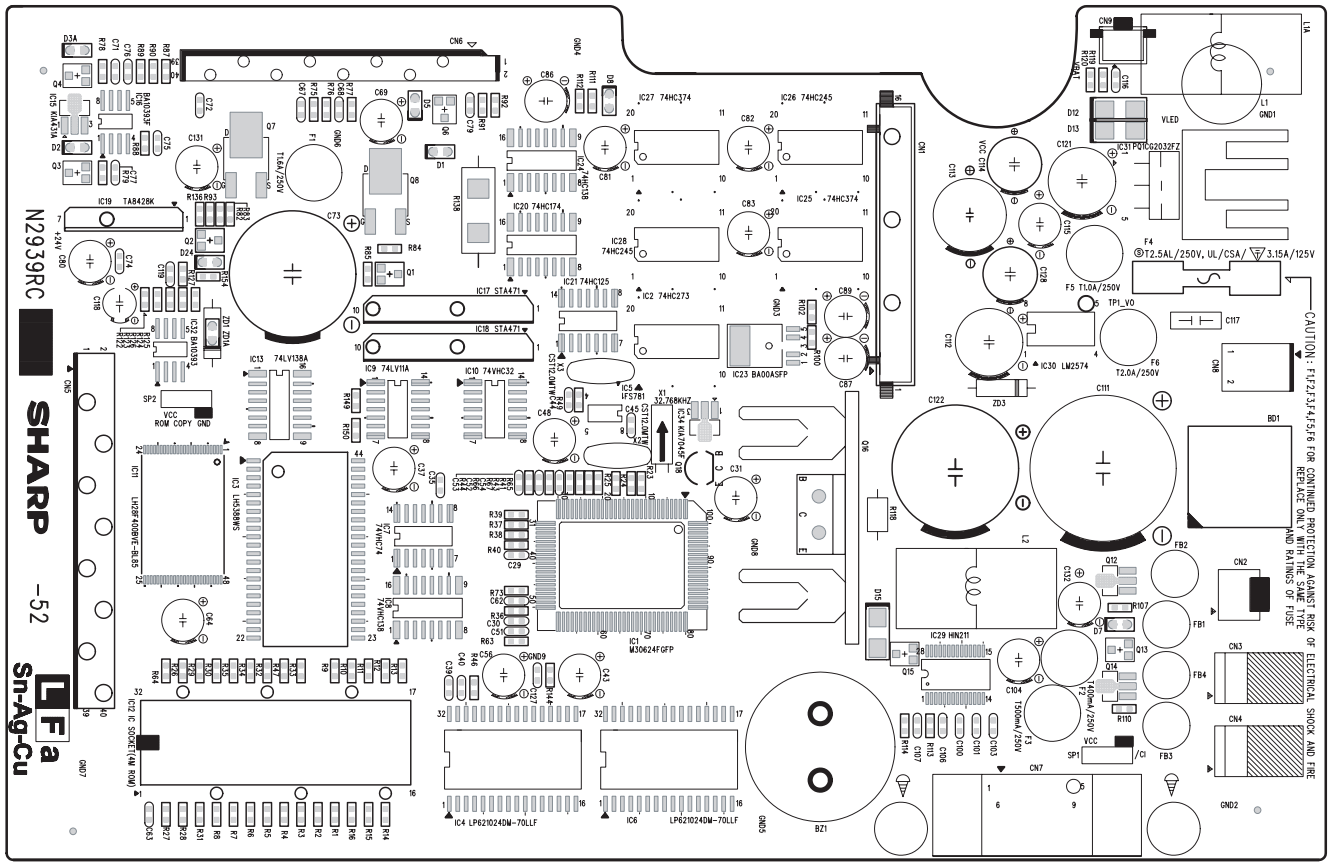

6/7
RS232C DRIVER
RS232C CN(D-SUB 9Pin)
CN7
EFCB3225I3TS X 8
IC29
HIN211
SHORT PIN
SP1
F3
T500mA/250V
100ohm*5
1000pF*5
KRC111S
Q15
D9
1SS355
C100
C101
C102
C103
C104
C105
C106
C107
C108
C109
C110
R113
R114
R115
R116
R117
R146
R147
R148
FB5
FB6
FB7
FB8
FB9
FB10
FB11
FB12
VCC
/CD
RD
/SD
/ER
/DR
/RS
/CS
/CI
5V
/RS
/ER
/SD
RD
/CD
/DR
/CS
/CI
P64
P74
P67
P66
P75
P77
P76
/S9
P91


PRINTER DRIVER
7/7
TM
TM1
EFCB322513TS
FB13
C67
100pF
R75
18KF
R76
4.7K
C68
0.1uF
VCC
STA471A
IC17
IC18
JAS
JBS
JCS
JDS
RAS
RBS
RCS
RDS
/JPFA
/JPFB
/JPFC
/JPFD
/RPFA
/RPFB
/RPFC
/RPFD
FB14
FB15
FB16
FB17
FB18
FB19
FB20
FB21
EFCB322513TS(FB14-FB21)
VREF
/JPES
/RPES
FB22
FB23
C75
C76
0.1uF
R88
R89
100 K
+2.4V
IC16A
IC16B
BA10393F
R79
R78
4.7K
C77
C71
330pF
Q3
Q4
KRC111S
D2
D3
1SS355
P91
/S4
/S2
IC15
KIA431F
R80
240
C70
1000pF
PHUPS
FB25
R92
1K
R91
1K
C79
1000pF
Q6
D5
/S3
VH
FB26
R77
20K
C69
10uF/50V
C73
2200uF/35V
F1
T1.6A/250V
Q7
NTD2955
R83
10K
R82
5.6K
Q2
2SK2731
+24V
R136
(47 K)
R93
15 K
C131
22uF/16V
/RES
D24
1SS35 5
R154
1K
D23
D25
D26
VHCOM
STRB1
STRB3
VJCOM
VRCOM
FB27
FB28
JP1
[0 SHORT]
EFCB322513TS

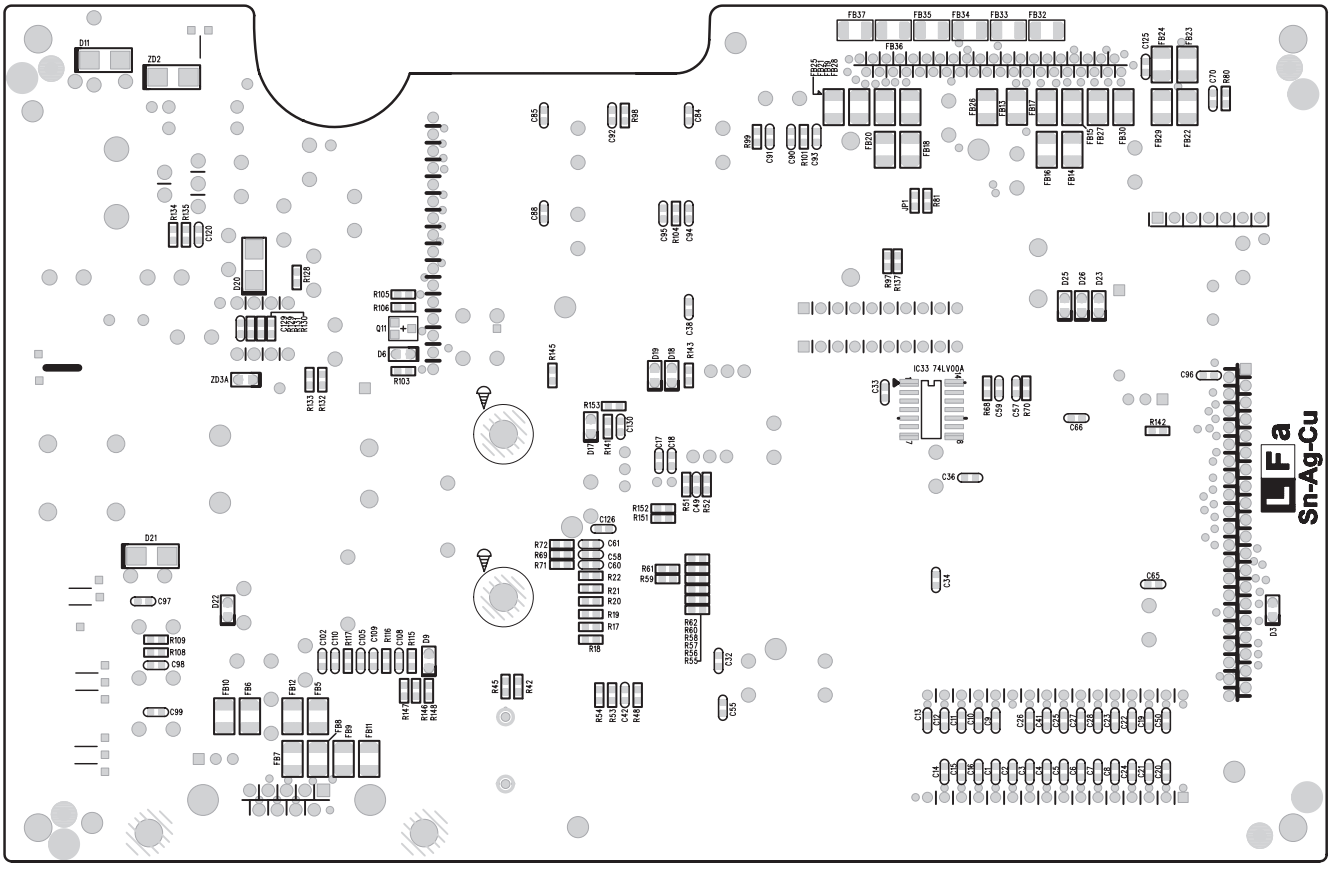

1/1
KEYBOARD&MODE SW
XE-A401 KEYBOARD
MODE SW
CN4
KEY_CN2 5204S-1245
KEY_CN7 5203-2246
47K*9(R16-R24)
PLACE NEAR CONNECTER
FROM MAIN
KEY I/F CN(40Pin)
40/FE-BTYK-N
POP UP
POP UP CN(15Pin)
15/FMN-BTYK-A
IC3
9 P/N :GND
10'PIN : NC
KID6083AP
KTA1271Y(Q1-Q7)
KRA101M*7(Q8-Q14)
74HC139

PWB LAYOUT

■ A SIDE


N2939RC
SHARP
-52
LFa
Sn-Ag-Cu
CAUTION : F1,F2,F3,F4,F5,F6 FOR CONTINUED PROTECTION AGAINST RISK OF ELECTRICAL SHOCK AND FIRE. REPLACE ONLY WITH THE SAME TYPE AND RATINGS OF FUSE

■ B SIDE



SHARP

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